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The Drake Passage opening and its effects: an old friend with a new insight

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The impact of the Drake Passage (DP) opening on climate is being debated for dozens of years. Indeed, being one of the major geographical changes occurring during the Eocene and at the beginning of a global climate cooling, it has often generated a lot of interest. To date, even though the overall signal remains unclear, it is considered as one of the main potential cause of the contemporaneous climate change. Several model studies have been aiming to assess the importance of this gateway opening through different more or less complex models. However, according to our knowledge on palaeoenvironments, most of them considered unrealistic boundary conditions (notably a low pCO_2 or a today like geography) that might corrupt the transposition of their results to the original deep-time context. Therefore, in order to better understand how climate might have been affected by this gateway opening and to trace its history, the DP question is here evaluated using an up2date IPCC like model, the IPSL-CM5A2, and Eocene-like boundary conditions (1120ppm, 40Ma land-sea distribution including an open Panama Seaway). Five simulations have been performed using a closed Drake configuration plus four different DP depths 100m, 300m, 1000m and 2500m. These experiments should help to understand if the impact of the DP was progressive or rather non linear while the passage deepened. Our results will be compared to Neodymium data and will be discussed in the broader context of the Eocene-Oligocene climatic transition.